

Investigating fungus growth affected by the acid

Aim :

To investigate how different dilution of acid affects fungus growth on bread.

Hypothesis:

I hypothesize that the more corrosive the acid is it will produce more fungus infection. I think this because acid breaks down the bread that is later on turned into nutrient. Fungus absorbs the nutrient broken down by acid which helps the fungus to accumulate greater.

Independent variable:

Independent variables are what you change throughout the experiment. The independent variable for this experiment is the amount of water used to dilute the hydrochloric acid.

The different kinds of ratio of Acid to Water (ml):

- A) 1:1
- B) 1: 2
- C) 1:3
- D) 1: 4

Dependent variable:

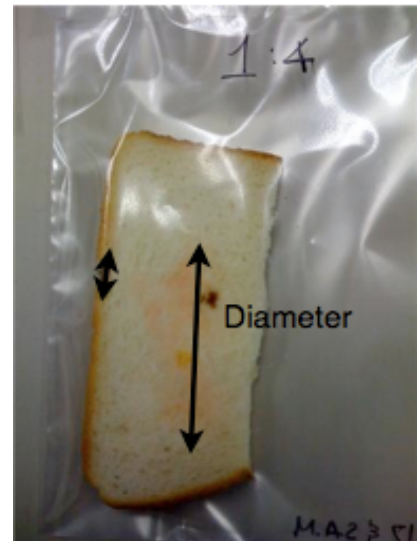
Dependent variables are what we measure in the experiment. The dependent variable for this experiment is the amount of acid and water used. The ratio between water and acid. We are going to measure the amount of fungus growth by using ruler to measure the diameter.

Controlled variable:

Controlled variables are what you keep constant through out the experiment. We kept the use acid on each test tube constant.

Materials/Apparatus:

1. 2 breads: To test how liquids affect fungus growth on bread.
2. Two 150 ml beaker: For holding the hydrochloric acid and the water when testing.
3. 50 ml of water: Liquid used for finding out its affect on fungus growth on bread.
4. 25 ml of hydrochloric acid: Liquid used for finding out its affect on fungus growth on bread.
5. Gloves: To not get liquids on our hands.
6. 2 plastic bag: For holding the bread.
7. Tape: For taping up the plastic bag
8. Scissor: For cutting the tape
9. 5 ml Syringe: For putting liquids in the test tube.
10. Test tube: For mixing and holding the liquids together.
11. Camera: For recording results.
12. Ruler: To measure the diameter.



How I measured the diameter.

Method:

1. Set all apparatus on the table. Make sure everything is rinsed before used.
 2. Cut the 2 breads into half. (you will have 4 slices)
 3. Pour 50 ml of water into the 150 ml beaker and 25 ml of hydrochloric acid into the other.
 4. Introduce fungus to the 4 slices of bread by putting it on the floor and giving pressure to it.
 5. Put the breads in the row on the table.
 6. Use the syringe and put 1 ml of hydrochloric acid in 4 of the test tubes.
Put 1 ml of water into the first test tube
Put 2 ml of water into the second test tube
Put 3 ml of water into the third test tube
Put 4 ml of water into the forth test tube
 8. Start pouring the test tube with water and hydrochloric acid in the ratio of 1:1 onto the 1st bread.
 9. Then pour the test tube with water and hydrochloric acid in the ratio of 2:1 onto the 1st bread.
 10. Pour the test tube with water and hydrochloric acid in the ratio of 3:1 onto the 1st bread.
 11. Finally pour the test tube with water and hydrochloric acid in the ratio of 4:1 onto the 1st bread.
 12. Label the plastic bags and put each bread into the right bags.
 13. Tape the plastic bag.
 14. Leave it in a place where it is safe.
 15. Get a camera and take a picture for sharing results later and to compare.
 16. Also measure the Diameter and recording on it on a table.
- *After a few days you will see different fungus growth on the 4 breads.

Example of a table you can use:

Bread	Liquid	Day 1	Day 2	Day 3	Day 4
1	Water				
2	Milk				
3	Soda				

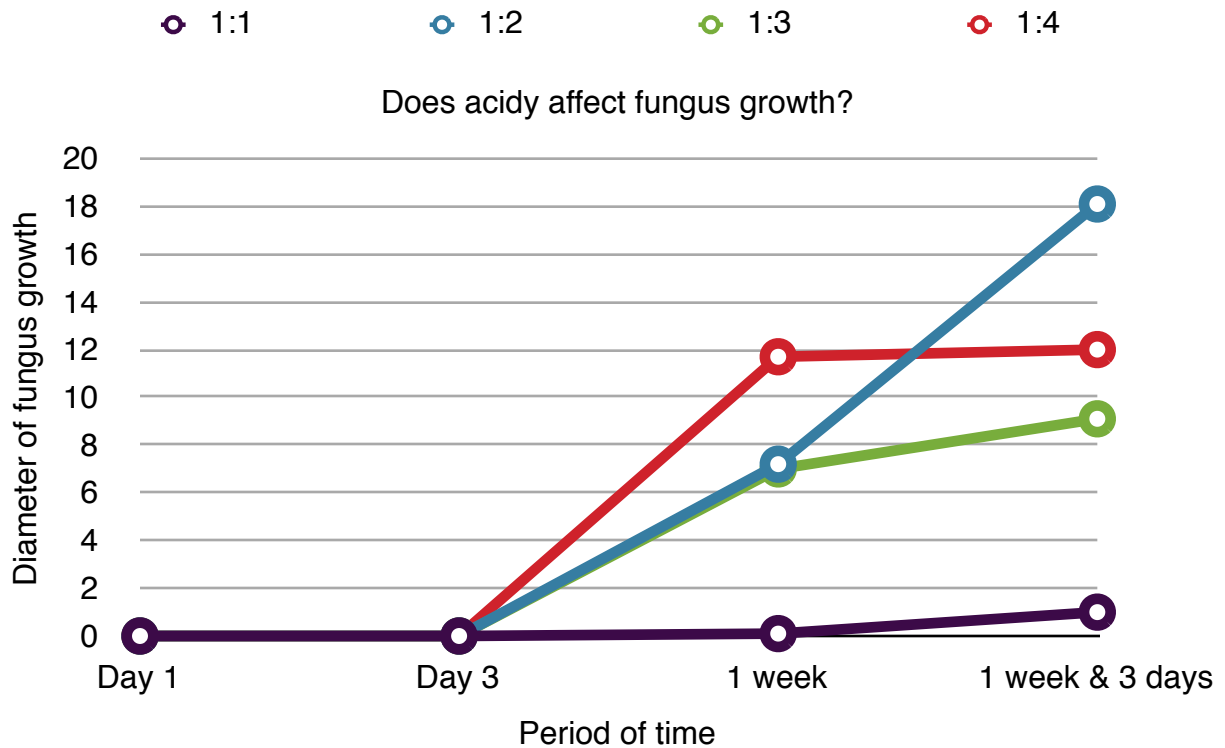
Data collection:

Diameter of fungus growth (cm)							
Test Tube	Acid (ml)	Water	Dilution factor acid water	First day (cm)	3rd day (cm)	1 week (cm)	1 week and 3 days (cm)
1	1 ml	1 ml	1 ml : 1 ml	0	0	.1 cm	1 cm
2	1 ml	2 ml	1 ml : 2 ml	0	0	7.2 cm	18.1 cm
3	1 ml	3 ml	1 ml : 3 ml	0	0	7 cm	9.1 cm
4	1 ml	4 ml	1 ml : 4 ml	0	0	11.7 cm	12 cm

Observation:

- For the first three days there weren't any fungus growth on any of the bread.
- After the first week the most diluted acid had the most fungus growth.
- Over the next three days the diluted factor of '1 ml acid : 2 ml water' had the greatest fungus growth of 18.1 cm.

Data processing:



Pattern or trend:

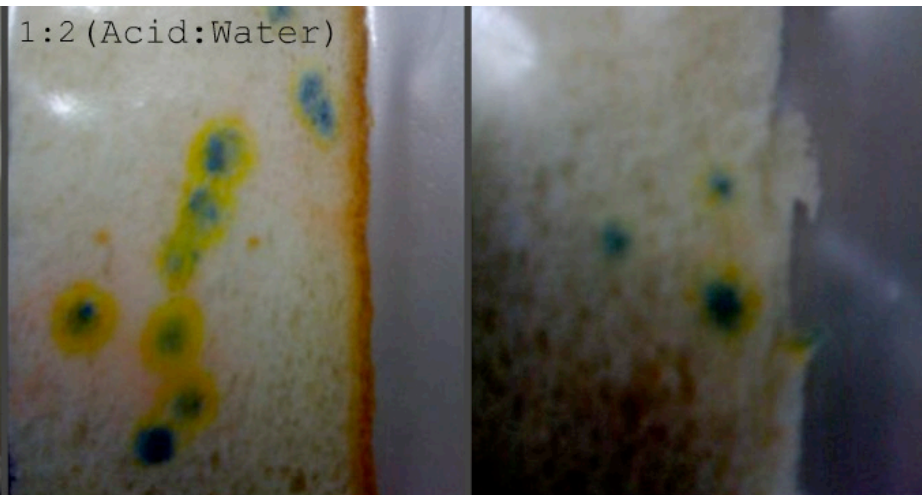
1. For the first 3 days the bread produces no fungus growth at all.
2. In the first week the bread with the diluted factor of 1:2 and 1:3 has produced about the same amount.
3. The bread with the least diluted factor of 1:1 didn't produce much fungus.

Pictures:



Bread with ratio of 1:2 (Acid:Water)

After 1 week

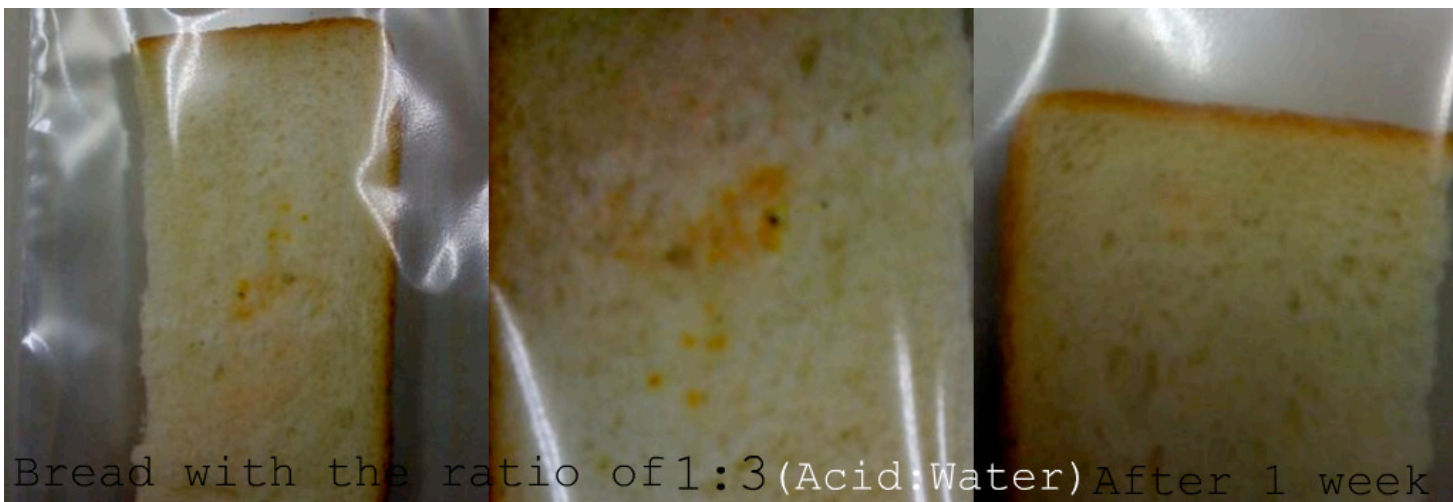


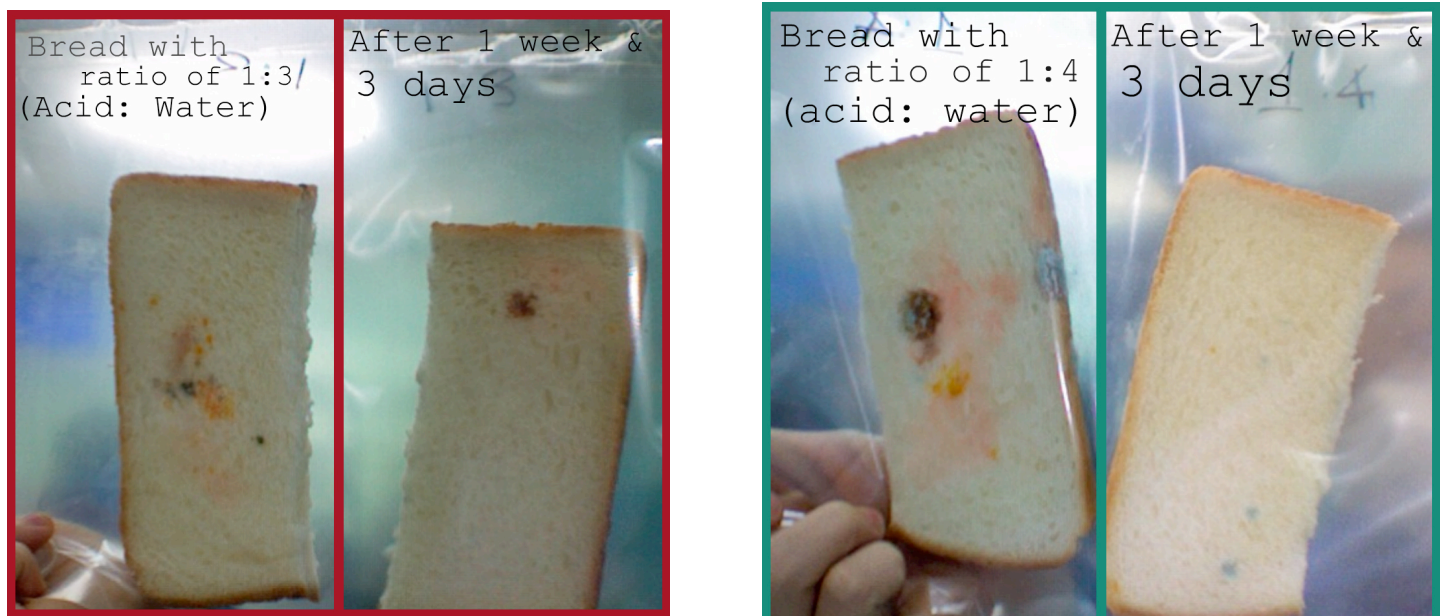
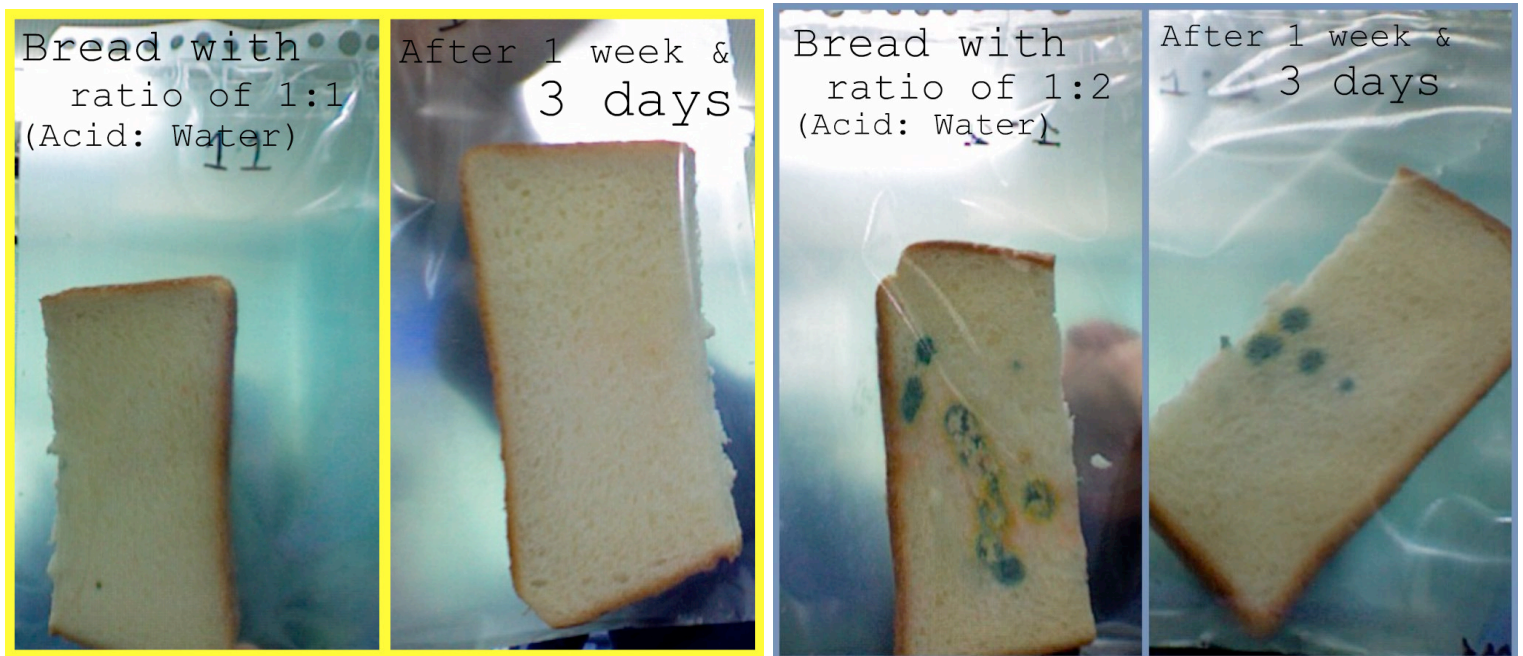
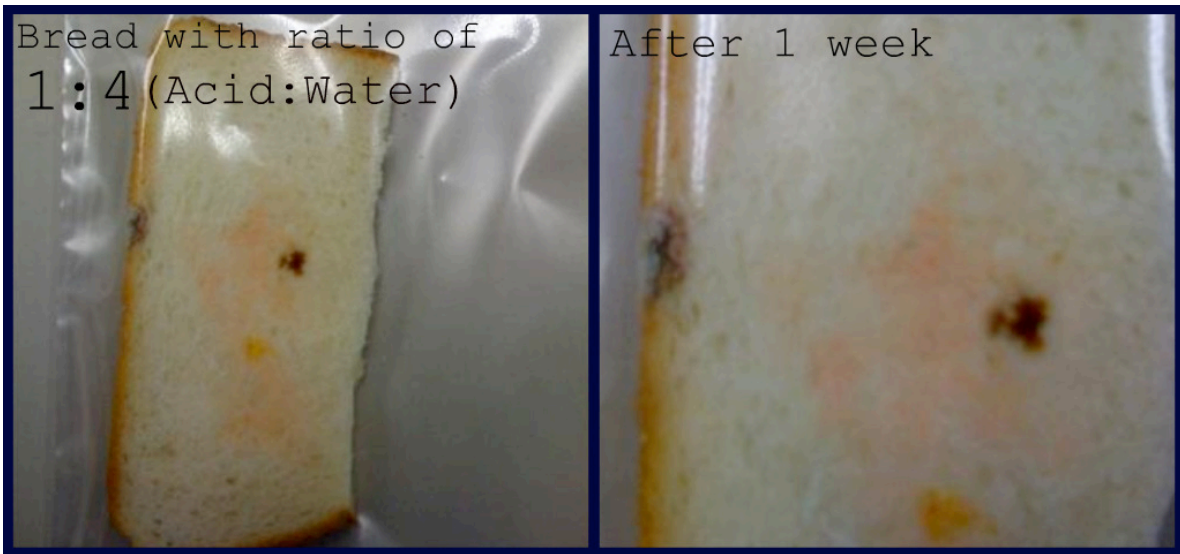
1:1

After 1 week



Bread with the ratio of 1:3 (Acid:Water) After 1 week





Conclusion:

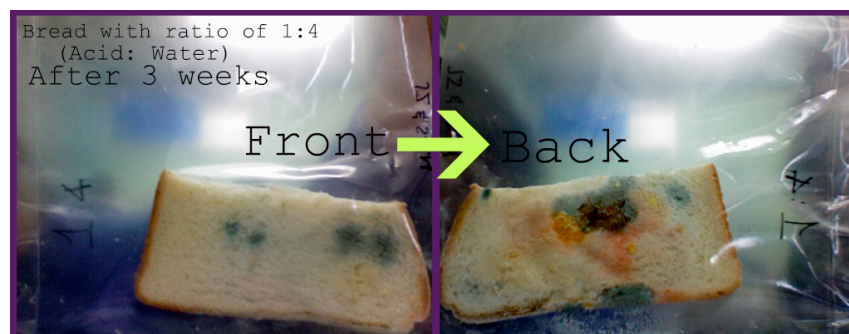
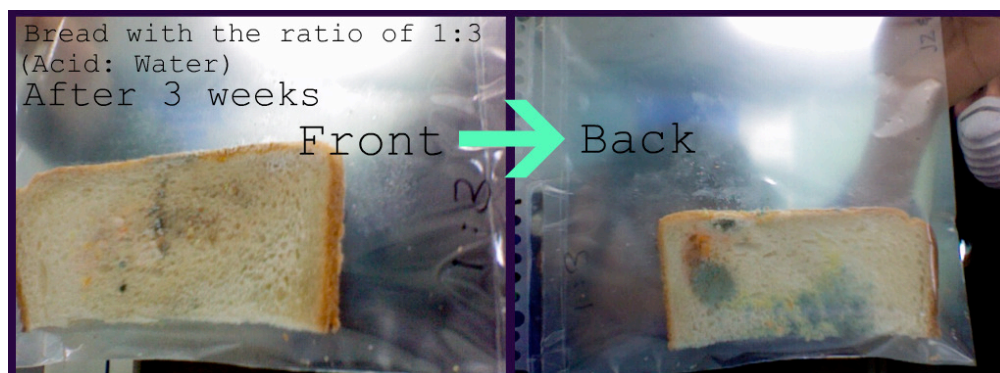
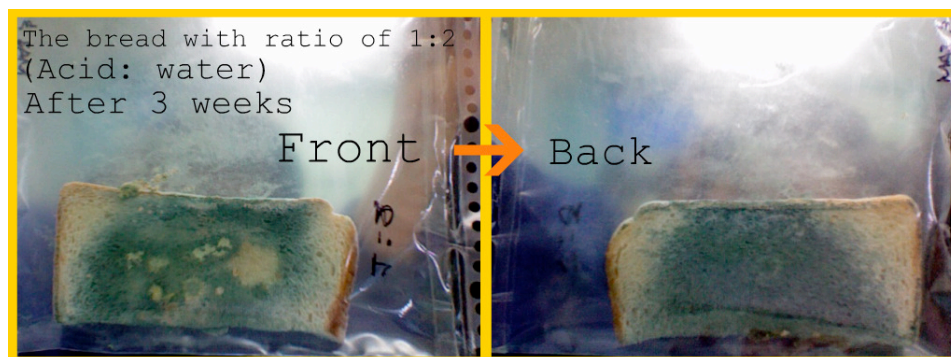
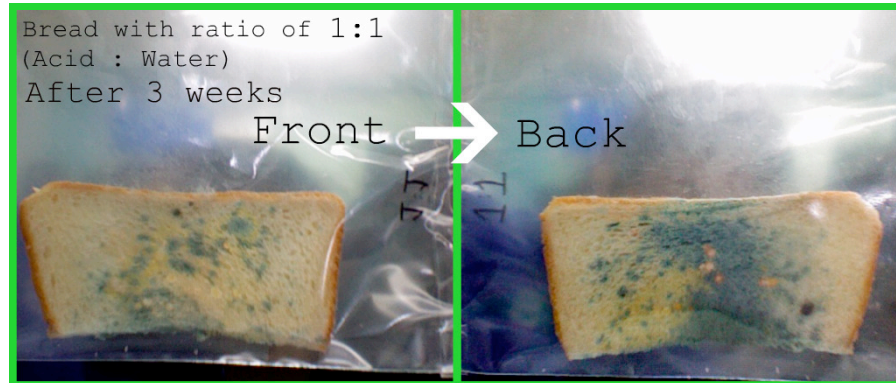
As shown on the graph above the first 3 days none of the bread grew any fungus infection. After 1 week it started to produce fungus. The dilution factor of 1ml:1ml (Acid: Water) had the least fungus infection with the diameter of 0.1 cm, the dilution factor of 1ml : 2ml (Acid: Water) had the second greatest fungus infection with the diameter of 7.2 cm, the dilution factor of 1ml: 3ml (Acid: Water) had the second least fungus infection with the diameter of 7 cm, and finally the dilution factor of 1ml: 4ml (Acid: Water) had the greatest fungus growth with the diameter of 11.7 cm. This stated that my hypothesis predicted was incorrect but after 3 more days (1 week and 3 days) the dilution factor of 1ml: 2ml (Acid: Water) had the greatest fungus infection with the diameter of 18.1 cm and the dilution factor of 1: 4 had the second greatest fungus growth with the diameter of 12 cm. With this result I came up with a new hypothesis: Acidity does help grow fungus infection but too much acidity can prevent the fungus growth from happening. I think this since acid breaks down the bread and the nutrient is absorb by the fungus but if it breaks down every nutrition in bread completely there will be no nutrition for the fungus to absorb which leads to no fungus growing.

Evaluation:

1. If we have left the bread for another 3 days we could have got more results which could have helped us with our predicted outcome after the experiment and to be more reliable on our results.
2. When introducing fungus onto the bread was it fair? If not it could have affected a bread with more dust or dirt, which could have caused a bread to produce more fungus then the other.
3. Cleaning (rinsing & drying) all apparatus after being used, so that it doesn't affect your experiment.

Additional:

Picture after 1 more week:



Final Conclusion:

These pictures are from 1 more week after the experiment. After 1 more week I can up with a new hypothesis. I hypothesis that acid doesn't prevent the fungus infection on bread, but it rather helps to grow the infection greater. As you can see from the picture of the bread with the dilution factor of 1:1 and 1:2 they had the greatest fungus growth infection and also had the most concentrated acid on them. This means my hypothesis predicted at the start of the experiment was correct.